REMARKS

Examiner Kielin is thanked for his ongoing and careful examination of the subject Patent Application.

2. The disapproval to the drawings under 37 CFR 1.83(a) has been addressed by limiting the cap layer 25 of FIGs. 2h and 3g to the area of the copper damascene as defined by the patterned photoresist mask 19, 39 in FIGs. 2e, 3d, respectively. Applicants trust this change meets with the Examiner's approval.

4. Reconsideration of the rejection of Claims 1-2, and 4, 6, 10–12 under 35 U.S.C. 103(a) as being unpatentable over Lin (US 6,093,656) in view of Rathore et al. (US 6,069,068) and Datta et al.(US 5,567,300) is requested, in light of the following arguments.

Whereas there are similarities with regards to (1), there is no similarity with Lin regarding point (2). Lin's teaching that the blanket deposition of copper "could be done in a number of different ways..." is a blanket statement but does not teach anything. It is like saying "all roads lead to Rome" but it does not tell one how to get there. Even though reverse current electroplating is well known it does not follow that one skilled in the art would think of using it in connection with the damascene process. Reverse current electroplating for example is not mentioned by Rathore et al. either. As a matter

of fact, it is not mentioned anywhere in connection with damascening. This renders the combination of the two features by the Applicant unique. Further regarding (2), it is important to note that Applicant's invention solves the problem of global planarization of a substrate by etching away that part of the copper layer and barrier metal layer not covered by the reverse tone photoresist mask. The methods of Rathore et al. strictly address the filling and planarization of copper interconnections. In Applicant's method areas without trenches are free of copper, reducing subsequent CMP and, therefore, eliminating dishing of the conductor filled trenches.

Regarding (4), the cap layer is only one of several aspect of Applicant's method. While Applicant's invention parallels some prior art it does not detract from the unique feature of Applicant's invention– i.e., the reverse tone photoresist mask–as detailed above, but sets it apart from Rathore et al. and Lin. The same argument holds for the need of a copper seed layer per Rathore. Applicant maintains that his invention is unique and not obvious.

Regarding (3), while Datta et al. teaches reverse electroplating, Datta et al. does not teach the use of photoresist nor does he teach Applicant's methods of etching away parts of the copper layer and barrier metal layer not covered by the reverse tone photoresist mask. In Applicant's method dishing is eliminated because far less polishing is required.

Applicant fully believes the above facts amply demonstrate that his invention is unique and not obvious to a person of ordinary skill in the art, and that it is a better method of planarizing copper damascene. Individually, the references cited by the Examiner do not suggest Applicant's invention and it is only the combination of these references that suggest to the Examiner that a person of ordinary skill in the art could have modified these references to arrive at Applicant's invention. Based on the arguments above, Applicant believes that claim 1 is now allowable.

Regarding claim 4, as argued above, independent claim 1 is believed allowable, therefore, dependent claim 4 is also believed allowable.

Regarding claim 6, as argued above, independent claim 1 is believed allowable, therefore, dependent claim 6 is also believed allowable.

Regarding claims 11 and 12. Examiner cites a "prior art range" on page 6, line 1, but there is no indication what such a prior art range might be. Applicant's claim of a range is, therefore, entirely justified. As already mentioned, Lin merely states (in col. 3, line 65-67): "*Generally, it has been determined that a positive photoresist can transfer smaller patterns so it is better for smaller line widths than a negative photoresist.*" This is known by those skilled in the art but does not teach when reverse photoresist can cover spaces between damascene trenches when the trenches are separated by less than a critical dimension, i.e., dimensions ranging from 0.05μm to 0.2μm. As argued

above, independent claim 1 is believed allowable, therefore, dependent claims 11 and 12 are also believed allowable.

5. Examiner's *Response to Arguments* have been noted but Applicant does not agree with Examiner's conclusions.

Lin states "The deposition could be done in a number of different ways..." but Lin neither mentions electroplating nor reverse current electroplating. While Rathore et al. mentions electroplating for depositing copper, reverse current electroplating is not mentioned either. Lin's "The deposition could be done in a number of different ways..." is a bit like saying "Brownian motion will get you to Rome". Applicant believes, "Lin teaches away" because no subsequent invention would be then be novel which teaches another method of deposition.

6. We have reviewed the two related art references made of record and not relied upon by the Examiner and feel that neither of these suggest the present claimed invention.

Fiordalice et al., US 5,578,523.

Bernhardt et al., US 5,256,565.

All claims are now believed to be allowable.

It is requested that should Examiner Kielin not find that the Claims are now Allowable that he please call the undersigned attorney at (845) 452-5863, to overcome any problems preventing allowance.

Respectfully submitted,

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